DIAGRAM F

Database Translations

Subscriber	LRN/NNA	Numbering
303-320-1234	303-221-1111	LRN

Service Provider
Portability Database

-------- = SS7 Network

Route to 303-221-1111
(redirecting Party ID=303-320-1234)
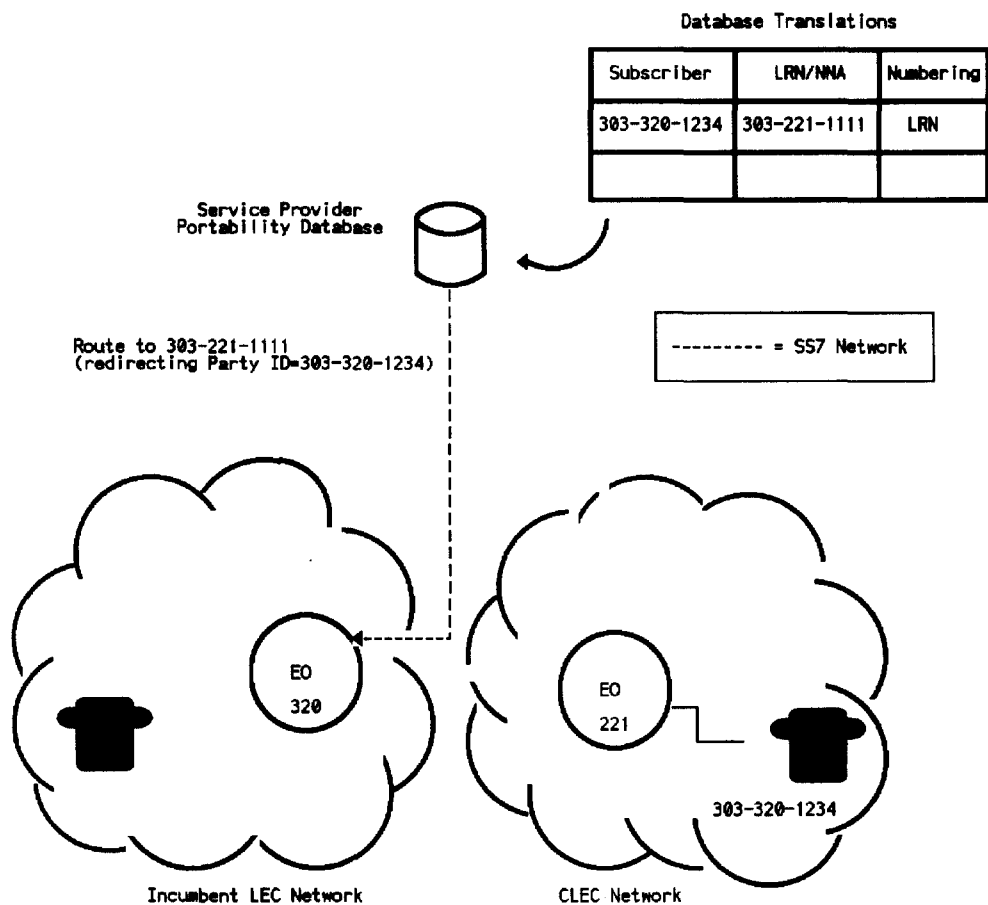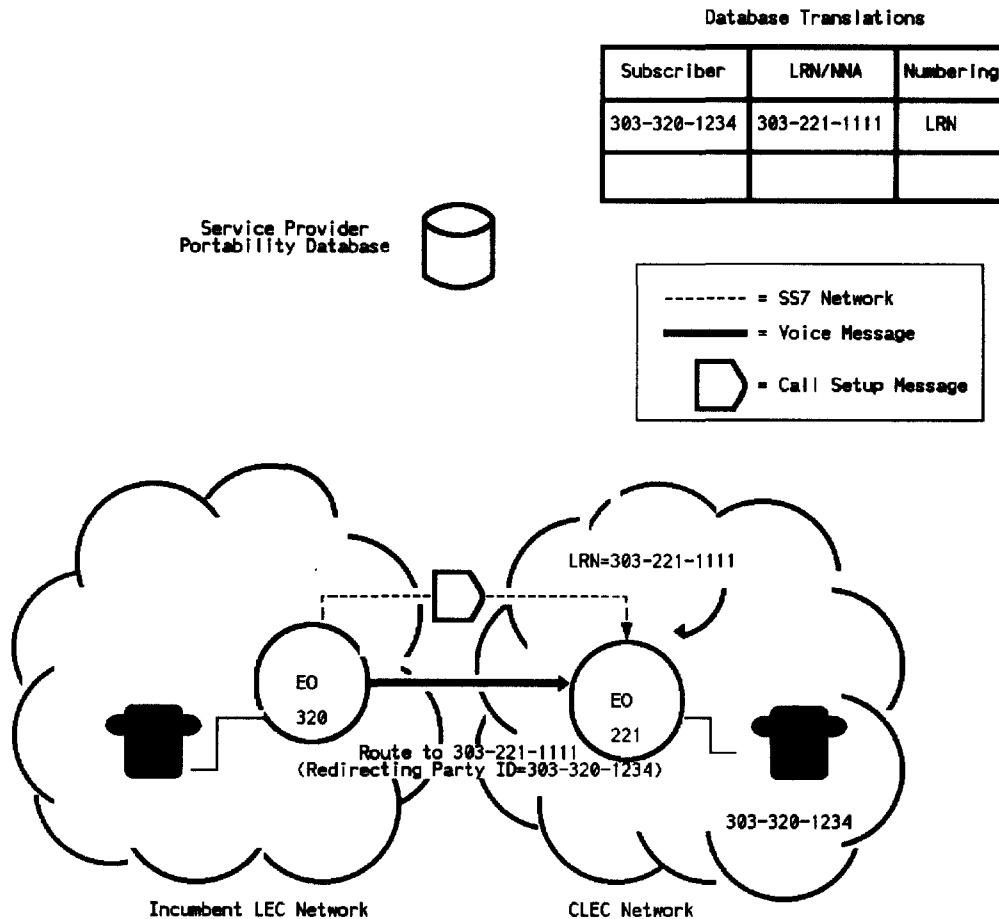
EO
320

EO
221

303-320-1234

Incumbent LEC Network

CLEC Network

The N-1 carrier will then pass along the returned data and LRN (303-221-1111) to the specific end office identified by the LRN. This process is illustrated in Diagram G. Again, the originating LEC need not support LRN to accomplish this.
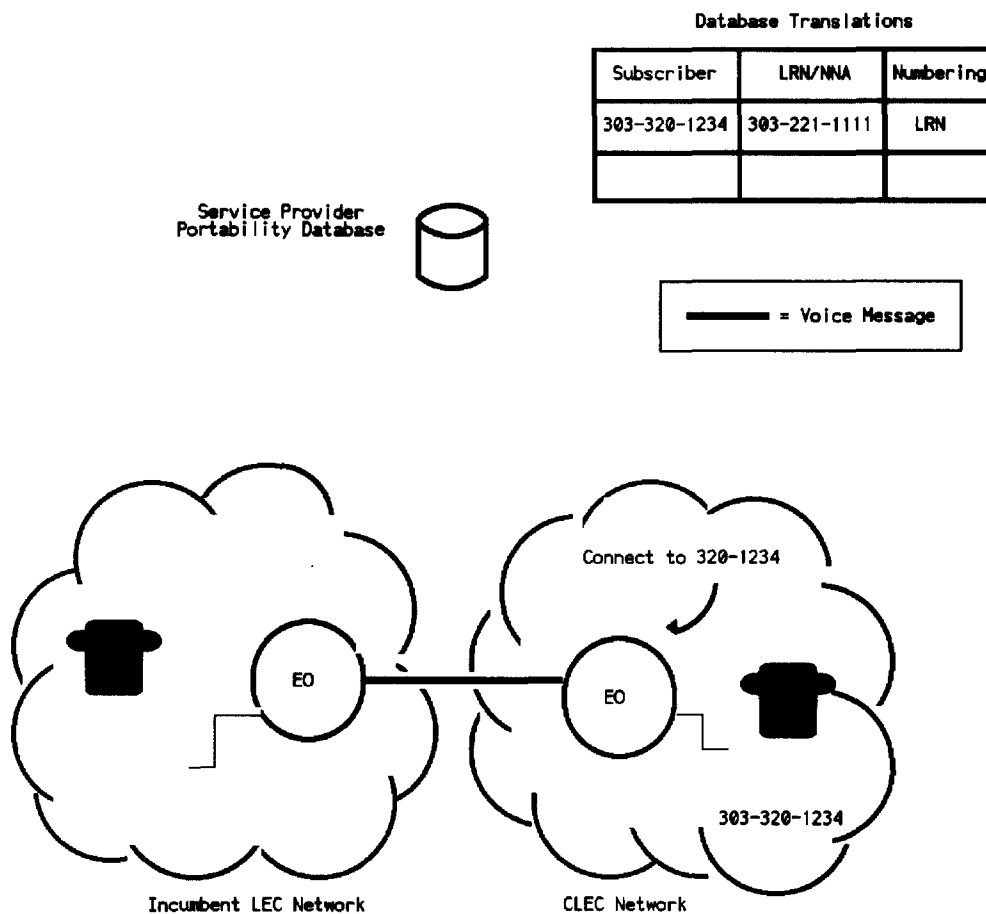
DIAGRAM G

Database Translations

Subscriber	LRN/NNA	Numbering
303-320-1234	303-221-1111	LRN

Service Provider
Portability Database

- - - - - - - - = SS7 Network

━━━━━ = Voice Message

⬠ = Call Setup Message

LRN=303-221-1111

EO 320

EO 221

Route to 303-221-1111
(Redirecting Party ID=303-320-1234)

303-320-1234

Incumbent LEC Network

CLEC Network

When the end office receives the call, it will compare the
LRN (303-221-1111) against its assigned LRN to determine whether
the call has been routed correctly. LRN can deliver the call
only as far as the receiving end office since an LRN identifies a
network end office, not a particular subscriber. If the call has
been routed correctly, the end office rearranges data delivered
in the call setup message to complete the call.

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Specifically, the end office takes the dialed number, 303-320-1234, which was stored in either the Generic Address parameter or the Redirecting Party ID parameter, and replaces the LRN in the Called Number parameter (303-221-1111) with the dialed number (303-320-1234). This functionality can be added to the network through the use of switch translations, switch modifications or existing AIN capabilities.

DIAGRAM H

Database Translations

Subscriber	LRN/NNA	Numbering
303-320-1234	303-221-1111	LRN

Service Provider
Portability Database

————— = Voice Message

Connect to 320-1234

EO — EO

303-320-1234

Incumbent LEC Network   CLEC Network

Once the end office has performed these substitutions, it terminates the call in the usual manner, using the Called Number data from the call setup message (303-320-1234) to indicate which subscriber on its network should receive the call.

B.   Transitional Database Solutions Are Evolutionary Steps Toward the Network of the Future.

While the medium term database solutions in which different numbering schemes can coexist in a particular area are, as just demonstrated, viable now, they must eventually be replaced by a national numbering scheme. It is critical to emphasize that when the time comes to make this transition, the medium term solutions will not, as some contend, be "thrown away." Most of the network adjustments required for medium term solutions will be used in a scheme that relies on a single, national numbering approach.

First, while medium term solutions require that the local exchange routing guide be updated and switches slightly modified, long term solutions require the same adjustments. The work performed for medium term solutions would simply carry over to the long term solution.

Second, service provider portability databases will remain virtually unchanged when long term solutions are adopted. Again, work performed for the purposes of implementing medium term solutions will already have been done and usable when a long term solution is deployed.

Third, if firms know that both medium and then long term solutions will be adopted, they will have the incentive to make operations systems changes (billing, provisioning, fault

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management etc.) for medium term solutions that can be easily expanded to accommodate those required for long term solutions. Thus, businesses would be unlikely to build changes exclusively to accommodate, for example, CPC numbering, a scheme in which only the NPA changes. Since most proposed long term solutions use separate 10 digit routing and billing numbers, companies would be much more likely to build changes allowing two complete ten digit numbers to be associated with a subscriber. In this way, changes in operations systems would be easily adaptable to a long term solution.

Nor is it true, as Bell Atlantic argues, that proceeding immediately toward the adoption of a national solution without first adopting medium term solutions would reduce vendors' costs.[15] It is unclear to what vendors Bell Atlantic is referring, but TWComm is aware of few vendors whose costs would increase as a result of a multiple solution approach. First, some switch vendors could actually reduce costs in a multiple numbering solution environment in which a specific switch need only support a single numbering solution because most switches on the market can already support one of the major numbering solutions,[16] and would require expensive alterations if required to support a less compatible national solution.

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[15]   See Bell Atlantic Comments at 10.

[16]   Thus, Nortel DMS-100 already supports LANP and Siemens switches already support CPC.

Second, portability database providers, such as U.S. Intelco, already support multiple portability solutions. A national approach would not therefore increase their costs.

Finally, numbering solutions would have no effect at all on signal transfer point ("STP") vendors' costs since portability solutions are transparent to STPs.

In sum, investment in medium term solutions would not be "thrown away" at all and would not result in higher costs for vendors. In fact, the central network changes required for medium term solutions would be directly transferrable to a long term solution. The costs in terms of non-transferrable upgrades and higher vendor costs for medium term solutions, while not nonexistent, are actually quite minimal. And, as discussed below, the overall costs of medium term solutions -- regardless of their transferability -- are relatively modest.

III. LECs Have Overstated the Costs of Implementing Service Provider Portability.

The cost of medium term solutions measured in required adjustments to the network and associated monetary expenditures, is likely to be relatively small given the benefits such solutions will bring to consumers of telephony services. Not surprisingly, many LECs have tried to show that the cost of number portability will be enormous, either because it will supposedly strain network operational systems to the breaking point (and possibly prevent vital services such as 911 and operator services from functioning) or because it will simply be prohibitively expensive.

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As explained below, however, deployment of medium term solutions is no more complex than the addition of any other capability to the network. Moreover, it can be accomplished without placing a significant strain on systems and at a relatively low price.

A. **LECs Have Exaggerated the Network-Related Costs of Implementing Number Portability.**

As the Commission knows, there is nothing new about incumbents exaggerating the complexity and damaging effects of network changes required to advance competition. Since the first attempts by regulators to loosen the local telephone industry's grip on the telephony market, incumbents have protested that the threatened damage to the network far outweighs any advantages competition will bring to consumers.[17] Yet every time the required changes have been implemented, the network degradation has failed to materialize.

The LECs' approach to service provider portability repeats this historical pattern. LECs commenting in this proceeding have gone to great lengths to demonstrate that there are still too many unanswered questions about even service provider portability, and that immediate deployment could severely damage the nation's telephone network. Alternatively, LECs have tried to argue that service provider portability will require extensive network alterations. But as demonstrated below, neither

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[17] See e.g., Use Of The Carterfone Device In Message Toll Telephone Service, 13 F.C.C.2d 420, 424 (1968); Hush-A-Phone Corporation And Harry C. Tuttle v. AT&T, 20 F.C.C. 391, 398 (1955).

assertion holds up under close scrutiny. On the contrary, having now seen the best that the LECs can offer in terms of threatened damage to the network and required upgrades, TWComm is more confident than ever that the medium term service provider solutions it advocates can be deployed in the short term without risk to the network and with relatively modest technical adjustments.

In order to dispel the notion that deployment of medium term solutions is too complex or will overburden the network, TWComm has responded below to comments supporting that position. The arguments generally fall into one of three categories and the responses are organized accordingly. First, some of the changes to the network that provider portability is asserted to require do not apply to medium term solutions. Second, even when changes required by medium term database solutions have been accurately described, their complexity has been exaggerated. Finally, certain threats to the network or changes caused by number portability identified in the Comments will only be serious for LECs that have allowed their networks to become outdated. The extra costs thus required should not be attributed to number portability.[18]

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[18]   Many of the LEC arguments also apply only to location portability. Since there is an emerging consensus, which TWComm supports, that the Commission should only intervene to promote service provider portability at this time, this section only addresses arguments pertaining to service provider portability.

Some of the LEC arguments also concern issues that should not be part of the policy analysis for number portability. For
(continued...)

1. Arguments That Do Not Apply To Medium Term Solutions

Despite LEC claims to the contrary,[19] service provider portability (at least until a national solution is adopted) need not require significant switch development. As explained above, database technology ensures that each carrier will only need to support the one numbering scheme that best suits its switches. In some cases this will require modest upgrades, in others virtually no upgrade at all.

Further, medium term solutions do not require investment in AIN triggers, although some LECs assert otherwise.[20] All three major medium term service provider portability solutions (CPC, LANP, or modified LRN) function with both IN and AIN triggering. It is possible that a long term solution might, however, require investment in AIN triggers.

Similarly, while it is true that number portability will require new SS7 standards (such as a "portability indicator" which signals to downstream switches whether a query has been made or a determination of which SS7 parameter will hold the

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[18] (...continued)
example, BellSouth raises the problem that number portability affects the current systems used to publish, bill, and deliver telephone directories. See BellSouth Comments at 45-46. This is not an issue that the Commission need consider seriously in this context. Moreover, directory publishers have every incentive to adjust these highly profitable businesses to changes in the network.

[19] See Bell Atlantic Comments at 14; BellSouth Comments at 37; GTE Comments at 19; GVNW Comments at 8.

[20] See BellSouth Comments at 37. See also GTE Comments at 19; GVNW Comments at 8.

called number),[21] this is again only necessary for long term solutions. Medium-term solutions can function without any need for new SS7 standards, although voluntary bilateral agreements on the issue may prove helpful.[22]

BellSouth's argument that the telephone industry has not adequately considered the need for technical and administrative guidelines for a neutral third party administrator is again unpersuasive with regard to medium term solutions. There is no technical requirement for a single nationwide database or SMS provider. Already at the state level in Illinois, deployment schedules dictate that SMS provider selections and related processes and interfaces be implemented in very short time frames. Moreover, current industry participation in Illinois will create de facto standards that are functional and can be quickly expanded to other areas.

Moreover, LEC statements that number portability threatens various CLASS features such as Caller ID are generally inaccurate (at least with regard to either medium term or long term database solutions).[23] In medium term database solutions, the ported subscriber has switch translations that provide the correct ID when the ported subscriber calls other subscribers. Since the

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[21]   See Bell Atlantic Comments at 14; GTE Comments at 19. See also Cincinnati Bell Comments at 7.

[22]   Long term solutions will likely provide greater call routing efficiencies which will be maximized by SS7 standards.

[23]   See Cincinnati Bell Comments at 7-8. See also BellSouth Comments at 43-44.

ported subscriber's switch is supported with SS7 capabilities, the ported subscriber can receive Caller ID when called from other subscribers. Some adjustments will have to be made to accommodate Automatic Callback and Automatic Recall. But virtually all the switch vendors have either already made the necessary adjustments or have designed solutions.

Finally, the National Exchange Carrier Association raises the notion that portability could impose unbearable upgrade costs on rural carriers.[24] But this will not be true if the Commission adopts N-1 as the national call processing scenario. With N-1, a rural LEC would only have to query a database if it faced competition from another carrier within its service area. This will probably not happen in most rural areas for the foreseeable future. At the very least, rural carriers will have more than adequate notice that network alterations for portability will have to be made.

2. Alterations Whose Complexity Has Been Overstated

As some LECs observed, new database query capabilities will be required for number portability to function.[25] But this presents only a modest alteration for the vast majority of carriers because they have already deployed IN or AIN technology throughout their networks. This technology, as the LECs well know, forms the basis for portability querying capabilities.

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[24]   See National Exchange Carriers Association Comments at 2.

[25]   See Bell Atlantic Comments at 14; GTE Comments at 19.

BellSouth is similarly correct that number portability would mean that a telephone number would no longer identify a serving switch with the result that the location identifier for repair centers would no longer function.[26] But this does not present a difficult problem. A simple translation between the dialed number and the routing number will resolve the issue.

LEC arguments that number portability will effect operator services are again partly correct but greatly exaggerated.[27] BellSouth, for example, argues that number portability could cause calling card queries to be routed to the wrong line information database ("LIDB"),[28] thus resulting in incorrect billing and settlements.[29] Specifically, BellSouth appears to be concerned that queries for CLEC subscriber lines would still go to the LEC LIDB. In fact, however, there are at least three fairly obvious solutions to this problem. First, if a LEC and a CLEC can arrive at a bilateral interconnection agreement, the problem could be solved by the CLEC using the incumbent LEC's

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[26]   See BellSouth Comments at 40.

[27]   See BellSouth Comments at 41-42; SBC Comments at Appendix E.

[28]   The LIDB contains data on individual telephone lines. For example, when charges for line A are to be billed to another line, the network makes an LIDB query to determine the other line's number. All billing information is then sent to the telephone number associated with the other line.

[29]   See also SBC Comments at Appendix B. SBC makes many broad assertions in Appendix B as to service portability's impact on operator services and LIDB features. Without a more detailed explanation of exactly what problems SBC is referring to, however, it is impossible to respond intelligently. The issues raised by SBC in Appendix C are discussed below.

LIDB. In that case, queries could be correctly routed with no changes to the network.

If, on the other hand, the CLEC uses some other LIDB, there are two additional possible solutions. Ten digit Global Title Translations ("GTTs") can be used at the signal transfer point (for those subscribers that have been ported from the LEC to the CLEC). This will result in LIDB queries being routed correctly. Alteratively, ten digit GTTs can be used at the portability service control point in order to correctly route LIDB queries. In this case, for those NPA-NXXs that contain ported subscribers, the STP would be translated to route all LIDB queries to the portability database, which would in turn route the queries to the correct LIDB databases.[30]

SBC also raises several further issues regarding changes to operator assistance.[31] Unlike most other LECs, however, SBC suggests solutions to the problems it raises. The solutions SBC suggests appear to be reasonable.

It should be pointed out, however, that SBC incorrectly implies that, in a portability environment, operator service switches ("OSS") would need to have portability capabilities in

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[30]   BellSouth also makes reference to operator services systems making queries to portability databases for call disposition. It is unclear what "call disposition" means. If BellSouth is referring to Busy Line Verification, it is true that some operator services platforms may need to translate between CNA and NNA in order to perform Busy Line Verification. However, this need not be accomplished with an SS7 interface to the portability database. Other protocols may be used such as X.25 or TCP/IP.

[31]   See SBC Comments at Appendix C.

order to handle requests by customers for additional dialing

assistance.[32] In fact, as a transitional mechanism, an OSS

without portability capability could route the call to the

subscriber's old switch which could then route the call to the

ported subscriber's switch.

Several LECs raise the specter of the damage portability

will supposedly cause to the 911 functions.[33] TWComm takes this

issue very seriously and has devoted a considerable amount of

time to determining whether this is the case. TWComm has

concluded, however, that if number portability is implemented

correctly, it will not negatively impact 911. With any of the

medium term solutions, the correct Automatic Number

Identification (the number identifying the Customer's telephone

number for billing purposes) will be presented to the 911 service

provider, which allows 911 calls to be handled correctly.[34]

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[32]   See SBC Comments at Appendix C issue No. 1.

[33]   See BellSouth at 44. See also, National Emergency
Number Association Comments.

[34]   Some may argue that certain implementations of AIN will
cause 911 to fail. For example, on the AT&T 5ESS switch, 911
service providers using the 5ESS Emergency Ringback feature will
not detect Public Office Dialing Plan 3/6/10 triggers, resulting
in incorrectly routed emergency ringback calls. But this feature
interaction is simply not acceptable, with or without
portability, and must therefore be corrected regardless of
whether portability is deployed. Indeed, with careful trigger
strategies, like IN triggers or new AIN portability triggers,
even existing 911/AIN interaction problems can be alleviated.

Finally, claims that service provider portability will require enhanced billing capabilities[35] are also overstated. For example, if a CLEC matches LEC rate centers, (i.e., if a CLEC designs its call rating to duplicate the incumbent LEC's), the dialed number will be present and can be used for account identification and Vertical and Horizontal identifications.[36]

3. Alterations that only Pose Problems for Outdated Networks

Some parties have asserted that new or enhanced operation support system interfaces may be needed to support number portability.[37] Where carriers have upgraded their networks, as they ought to have, interfaces will only require modest network adjustments. The Commission must ensure that the costs caused by a carrier's failure to timely and efficiently upgrade its network are not attributed to number portability.

Similarly, where a LEC's equipment is outdated, its switch-related costs for handling portability may be unusually high. Again, these extra costs should not be attributed to number portability.

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[35] See Bell Atlantic Comments at 14; BellSouth Comments at 34; GTE Comments at 19-20.

[36] CLECs should not, however, be forced to match rate centers.

[37] See Bell Atlantic Comments at 14; GTE Comments at 19; GVNW Comments at 2.

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B. LECs Have Exaggerated the Financial Cost of Number Portability.

In addition to describing number portability's purported effects on operational systems, several LEC parties resort to claiming that number portability will be too expensive. GTE, for example, states that AT&T's number portability solution "would cost GTE a staggering *$1.65 billion* for its serving areas," an estimate that GTE claims does not include "the cost of operations support systems modifications or subsequent annual maintenance expenditures" which GTE claims could cost millions of dollars annually.[38] Cincinnati Bell ("CBT") states that its costs for implementing number portability would be somewhere between $20 and $60 million per LATA.[39] Finally, GVNW Inc./Management ("GVNW") estimates that it will take billions of dollars to establish and maintain portability.

It is, of course, extremely difficult to assess the accuracy of these estimates with any precision. Indeed, most parties, including most LECs, have not even tried to estimate the total cost of number portability.[40] Nevertheless, it is possible to examine the assumptions upon which the estimates are based. Not surprisingly, they are ones that tend to greatly inflate the estimates.

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[38] GTE Comments at 14-15 (emphasis in original).

[39] CBT Comments at 9.

[40] See BellSouth Comments at 55-57; Bell Atlantic Comments at 2.

For example, both the GTE and the CBT estimates include the costs of providing location portability[41] which increases enormously the cost of required upgrades over those required by service provider portability. Further, GTE's estimate is based on the cost of full LRN, which is a long term solution and includes many costs not found in the medium term solutions TWComm recommends for immediate deployment.[42]

Further, to the extent that LEC cost estimates assume the deployment of AIN technology, they are misleading for two important reasons. First, AIN includes a broad software package only a small part of which is used for portability.[43] Many LECs have already deployed AIN, independent of any concern for number portability capabilities.[44] It therefore contradicts cost causation ratemaking principles to attribute all AIN costs to

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[41]   See GTE Comments at Appendix A; CBT Comments at 9 n.16.

[42]   GVNW's cost estimates are also flawed. GVNW has tried to estimate the cost of database queries based on national calling data. Its $1.8 billion estimate would seem to be high given that many calls need not support portability. Moreover GVNW's second estimate, based on the required switch upgrades on a nationwide basis, would also seem to be high. This is because many switches, especially rural switches, need not support portability, and as shown above, even switches that must support portability will often require only minimal upgrades.

[43]   In addition to portability, AIN also supports, among other services, the Single Number Pizza Hut Application, 500, Centrex Extend, Switched Redirect, and Calling Name Delivery.

[44]   Several LECs have described in their annual reports the revenue generating potential of AIN technology that they have added to their networks. See e.g., Bell Atlantic Annual Report at 4 (Dec. 31, 1992); BellSouth Annual Report at 4 (Dec. 31, 1993); Pacific Telesis Group Annual Report at 14 (Dec. 31, 1993); Southern New England Telecommunications Corp. Annual Report at 16 (Dec. 31, 1994).

portability. It is simply unreasonable and unlawful, to require LEC competitors to fund LEC network upgrades.

Second, AIN is not even needed for medium term solutions, as there are less expensive triggering options available. IN, which has been deployed broadly in the U.S., can readily support number portability at a relatively low price. One switch manufacturer, for example, estimated that it would cost between $300,000 and $450,000[45] to develop an IN service provider portability trigger for TWComm's network. When spread out over an entire network, the cost per switch is thus extremely modest. Moreover, the added cost of installing the trigger for each switch is minimal.

While the costs of medium term solutions are relatively modest, it is still critical that the Commission implement a fair method for recovering all the costs associated with number portability. Many LECs either explicitly stated or strongly implied that CLECs or CLEC subscribers should bear the major share of these costs because they are the entities that "benefit" from portability.[46] It is a well established economic principle, however, that consumers enjoy a material benefit from simply having the option of another choice in services.[47] In this case,

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[45] This estimate was based on 3,000 to 4,500 staff hours billed at $100 per hour.

[46] See GTE Comments at 15; Bell Atlantic Comments at 21; Ameritech Comments at 6; CBT Comments at 10; NYNEX Comments at 21.

[47] See Burton A. Weisbrod , Q. Jour. Econ. (August 1964) LXXVIII, 471-477; Alfred E. Kahn, The Economics of Regulation: Principles and Institutions, Vol. 2 (1971), at 236-241.

the option of another local carrier will become more accessible
with service provider portability. Even the LECs' own reasoning,
therefore, supports TWComm's position that all carriers should
absorb the upgrade costs they incur for portability, and that
common costs should be allocated according to relative market
share.

IV.   The FCC and State Regulators Must Oversee the Transition to Number Portability.

The extensive effort required to address all of the LEC
party assertions regarding the potential problems with number
portability clearly illustrates the approach those parties are
taking to this issue. LECs are leaving no stone unturned in
their search for flaws and excuses for delay. At every
opportunity the parties whose cooperation must be secured for
number portability to be successful have made it unmistakably
clear that such cooperation will not be easily obtained.

This foot dragging makes it all the more important that the
Commission take a strong leadership role in overseeing the
implementation of service provider portability. Leaving the
issue up to the states will only offer LECs the opportunity to
exert their influence at the local level to delay deployment as
long as possible. While some states will be able to effectively
resist this pressure, history indicates that others will not.
LEC cooperation on a national scale can only be obtained if the
Commission intervenes.

Moreover, there are also technical reasons why federal
regulators should intervene. Despite the fact that most of the

technical decisions for medium term database solutions can be left to individual carriers, those solutions will only function together efficiently if the Commission mandates a national N-1 call processing scenario. Only a national approach to this issue will relieve the considerable strain on carriers caused by redundant database queries.

This is not of course to say that the states have not made and will not continue to make a valuable contribution to the regulation of service provider number portability. Their technical trials perform an invaluable service, and they should be encouraged to continue them.

But only the Commission can provide the necessary leadership for number portability. Moreover, it should use that leadership position to require the deployment of database service provider solutions in the very near term. As TWComm has demonstrated above, these solutions can be deployed now to provide a service far superior to anything offered by RCF or DID without requiring significant wasted investment or unworkable alterations to the network.

The Commission has in the past been understandably reluctant to require changes in the network such as those required by service provider portability. Regulators will no doubt be tempted to delay deployment while the industry continues to study this issue. The fact is, however, that the industry has enough information right now to know that database solutions can be deployed for number portability just as they have been deployed

for 800 service and LIDB services. Moreover, TWComm does not

make these statements lightly. Any real damage to networks or

lost investment in upgrades would effect TWComm's ability to

provide service as well as the telcos'. The real difference

between LECs and CLECs on this issue is that LECs have every

incentive to delay the introduction of competition and all its

consumer benefits while their competitors like TWComm have the

incentive to encourage it.

For the reasons described in these Reply Comments,

therefore, the Commission should adopt regulations to promote the

deployment of database service provider portability solutions in

the very near term. The Commission should adopt TWComm's

recommendation that all carriers be required to provide database

service provider portability within six months of a _bona_ _fide_

request therefor. Those requests must be accommodated with a

database solution response that complies with FCC prescribed

features and functions.[48] The selection of the proper long term

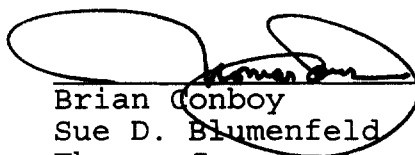solution should then proceed while the medium term solutions are

in place.

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[48]   As TWComm explained in its Comments, the FCC should
require that each medium term solution complies with the
following seven requirements: (1) the posted subscriber must be
able to keep his or her original telephone number, (2) the
routing numbers should be stored in a service control point
database; (3) either IN or AIN triggering should be used to
access the database, (4) the database should support the
carrier's choice of CPC, LRN or LANP, (5) all switch-based
functions, including CLASS functions, should function properly,
(6) CLECs should be able to charge long distance carriers for
access to their facilities, and (7) a ten digit routing code
should be used to route calls from the LEC to the CLEC.

CONCLUSION

For the reasons described above, TWComm respectfully requests that the Commission mandate the development of service provider portability in the manner described in these Reply Comments.

Respectfully submitted,

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